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ABSTRACT

The project described in this final report was designed to test and evaluate the impact of two-way cable television (CTV) on the delivery of public services to senior citizens in Reading, Pennsylvania. The experimental design, evaluative framework, and costs of establishing the system are presented, as well as the results of a before-and-after interview survey of elderly persons in the community. Effects of this project are described in the areas of knowledge about public services, involvement in political processes, and participation in social and community activities. Findings indicate that public uses of two-way CTV can serve important community purposes at a relatively low cost. The results of this study are intended to be of value to public officials in formulating telecommunications policy, to administrators of service delivery organizations, and to researchers concerned with the use of communication technologies in urban settings. (CHV)

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TWO-WAY CABLE TELEVISION: AN EVALUATION OF COMMUNITY USES IN READING, PENNSYLVANIA

Final Report to the
National Science Foundation

Summary

"PERMISSION TO REPRODUCE THIS MATERIAL HAS BEEN GRANTED BY

Mitchell L. Moss

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC) AND USERS OF THE ERIC SYSTEM."

by
Mitchell L. Moss
Director of Research,
Co-Principal Investigator

APRIL 1978

The NYU-Reading Consortium
New York University
Alternate Media Center/School of the Arts
Graduate School of Public Administration

LR006396

Cover Photographs by Eileen Connell

Preface

Public uses of cable television are among the most widely discussed applications of new communications technology. However, the promise of cable television as a community service mechanism has yet to be realized. This is due both to the regulatory environment which until recently inhibited the growth of cable systems in the United States, and to the uncertainty about the costs and effects of public uses of cable television. The rapid growth of cable television systems is now being projected as a result of the changing regulatory climate and advances in telecommunication systems.

This report presents the findings from an experiment sponsored by the National Science Foundation which was designed to test and evaluate the impact of two-way cable television on the delivery of public services to senior citizens. The experiment was conducted in Reading, Pennsylvania by New York University in collaboration with local government organizations and the ATC-Berks TV Cable Co. The findings of the project are grouped into two major areas: analysis of the implementation process; and evaluation of the effects of the two-way cable television system. These findings are presented in two volumes and a summary.

The first paper in Volume I presents "A Perspective on the Implementation Process" by Red Burns. The next paper, "The Design and Implementation of the Reading Interactive Cable System" by Ben Park, describes the planning and development of the two-way cable system. The third paper, "The Technical Configuration of the Interactive System" by Gary Schober, describes the technical equipment that was used in the Reading cable experiment and how

it was tested, deployed, and adapted. The role of citizens and public sector organizations in the development of the two-way cable system is discussed in the fourth paper, "Interactive Telecommunications and Local Community Processes" by Mitchell L. Moss.

The fifth paper, "Costs of the Reading Interactive Cable System and Alternatives for Replication" by Elizabeth Durbin and Judith Fields gives a detailed account of the actual cost components of setting up and operating the two-way cable system. It also analyzes the different cost components so that those interested in establishing similar systems can estimate what the costs might be.

The sixth paper, "Interactive Cable Television: A Frame Analysis" by John Carey, analyzes the communications processes and protocols which were used in the two-way cable system. The seventh paper in Volume I, "Citizen Participation Through Two-Way Cable Television" by Jody Brown and Mitchell L. Moss, examines the use of two-way cable television as a means of communication between senior citizens and local government officials. The last paper, "Economic Evaluation of the Output of the Reading Interactive System" by Judith Fields with Introduction, Summary, and Recommendations by Elizabeth Durbin, evaluates the output of the cable system from three perspectives: the average cost of interactive programming, the average cost per participant hour of specific social services, and the uptake of certain outreach programs.

Volume II of the Final Report, "Impact of a Neighborhood Communication Center System on the Elderly in Reading, Pennsylvania" by Mary Eckert, Glenn Gritzer, Louanne Kennedy, and Herbert Menzel, presents the results of a before-and-after interview survey of elderly persons conducted in

Reading. In addition to this summary, a set of composite videotapes of the two-way cable programming is available from the Alternate Media Center at the School of the Arts of New York University.

The findings of the experiment indicate that public uses of two-way cable television can serve important community purposes at relatively low cost. It is hoped that the results of this project will be used by citizens and communities in the planning and development of urban cable television systems. The findings of this study are also intended to be of value tc public officials in formulating telecommunications policy, to administrators of service delivery organizations, and to researchers concerned with the use of communication technologies in urban settings.

Acknowledgements

The project described in this report could not have been conducted without the assistance and good will of many individuals and organizations. We are particularly grateful to the senior citizens and public officials of Reading, Pennsylvania, who invested their time, energy, and cooperation in this project. Charles Brownstein of the National Science Foundation gave direction, advice, and encouragement throughout the course of the project. Al Shinn of the National Science Foundation was responsible for the initial decision to support the experiment. David Oppenheim, Dean of the School of the Arts, and Dick Netzer, Dean of the Graduate School of Public Administration at New York University provided a supportive environment which facilitated this interdisciplinary project.

Jacqueline Park, Co-Principal Investigator, played a key role in developing this project and coordinated the planning and initial experimental phase. Red Burns, Director of Implementation, directed the implementation and inspired the local support which enabled the two-way cable television system to become an integral part of the community. Ben Park initiated this study and helped to shape the design of the system. Herbert Menzel was responsible for the design, execution, and analysis of the survey research. Elizabeth Durbin formulated the economic research and analyzed the findings of the cost analysis and economic evaluation.

Eileen Connell, System Coordinator, devoted enormous effort to setting up and managing the day-to-day operation of the system. Special thanks must go to Earl Haydt, Regional Manager of the ATC-Berks TV Cable Co., who extended himself unfailingly to further the growth of the two-way cable system.

Gary Schober, Consulting Engineer, designed and adapted the technical configuration of the system in cooperation with Don Lotts, Chief Regional Engineer of the ATC-Berks TV Cable Co. Jerry Richter, Executive Director of BCTV and Pat Quarles, Production Manager of BCTV, have been dedicated to the project since its inception.

We have also been fortunate to have the advice of several experts in the field. Martin Elton has played a critical role throughout the course of the project, providing guidance to both the implementation and research teams. He reviewed earlier drafts of the final report and gave unsparingly of his time and energy. Robert Warren helped to conceptualize the research issues and has been a constant source of counsel and wisdom. Yale Braunstein, John Carey, Barbara Felton, Seymour Mandelbaum, and Percy Tannenbaum made valuable suggestions on earlier drafts of the final report.

Jody Brown, Mary Eckert, Judith Fields, Glenn Gritzer, Martha Hirst, and Louanne Kennedy were responsible for important aspects of the evaluative research. Candace Moss rewrote many sections of the final report and added major refinements to the text. Kevin Egan copyedited, proofread, and improved the final draft of this report. Gary Nichthauser skillfully coded much of the data collected during this study. Denise Andre, Edith Springer, and Sonia Ramirez have been most helpful in running the NYU and Reading offices smoothly and efficiently. Finally, thanks must go to David Syphus for typing this report.

SUMMARY

The NYU-Reading Cable Television Project

Can two-way cable television be used for community purposes? If so, are such uses technologically feasible and socially beneficial? The cable television experiment in Reading, Pennsylvania provides clear affirmative answers to both of these questions. It also shows that the cable system need not be of sophisticated design and that sufficient resources exist at the local level to develop public uses of interactive cable television. The results of this experiment are applicable to a broad range of community uses of two-way cable television. This report summarizes the findings of the experiment conducted in Reading to evaluate the costs and effects of using interactive telecommunications to provide services to senior citizens.

In 1975, the National Science Foundation funded an experiment in two-way cable television to be conducted in Reading, Pennsylvania by the NYU-Reading Consortium. The consortium consisted of the Alternate Media Center, School of the Arts, and the Graduate School of Public Administration of New York University, the ATC-Berks TV Cable Co., the City of Reading, the Berks County Senior Citizens Council, and the Reading Housing Authority. This collaboration involving a major private university, a private cable company, and local government organizations was essential to the project's four objectives:

1. To design and establish three neighborhood communication centers (NCCs) which were linked together by interactive cable television.
2. To train a staff of citizens to operate the interactive cable system.
3. To involve senior citizens and public agencies in the system's operation.
4. To provide live two-way public service programming through which senior citizens could communicate with each other and with service delivery organizations.

These four objectives shaped the scope of the evaluative research and fostered the development of community support for the two-way cable system. At the end of the experimental phase of the project, the interactive cable system was turned over to a newly-created non-profit corporation, Berks Community Television, which assumed responsibility for the operation of the two-way cable programming.

Five major research questions were addressed over the course of thirty months:

1. What are the costs of establishing and operating a system of interconnected neighborhood communication centers (NCCs) to provide services to senior citizens?

2. How can senior citizens and public agencies use two-way cable television to serve their needs?

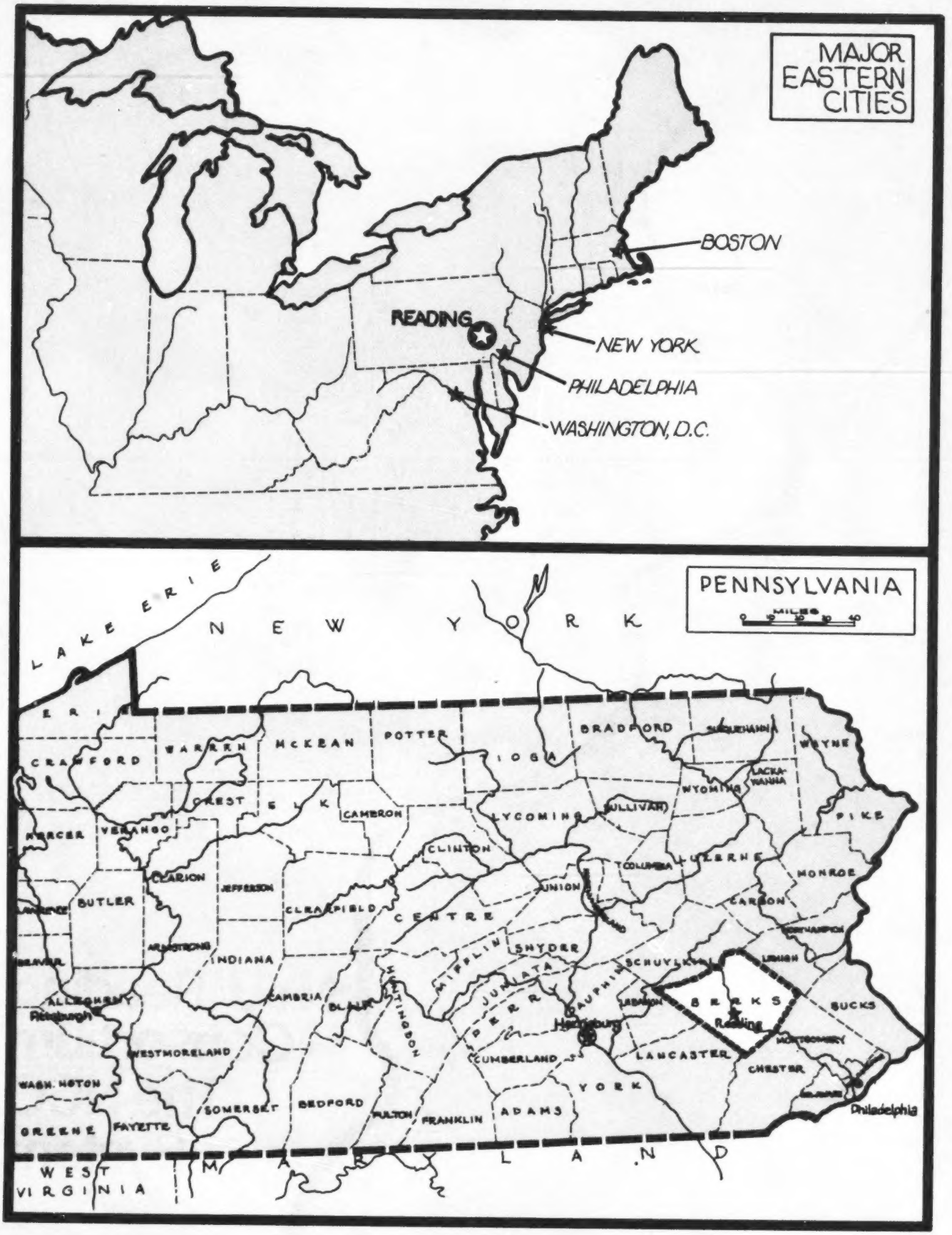
3. What are the effects of interactive cable programming on senior citizens' knowledge and use of public service?

4. What are the effects of interactive cable television on senior citizens' involvement in social and political processes?

5. How can community resources be mobilized to operate a two-way cable television system?

The Design of the Experiment

Reading, Pennsylvania is an industrial city of 87,643 located in Berks County, approximately 60 miles northwest of Philadelphia. It is the county seat and center of economic life for Berks County, which has a population of 296,352. The interactive cable television system was created for two complementary groups of users: the senior citizens, who constitute 16 percent of Reading's population; and the public agencies that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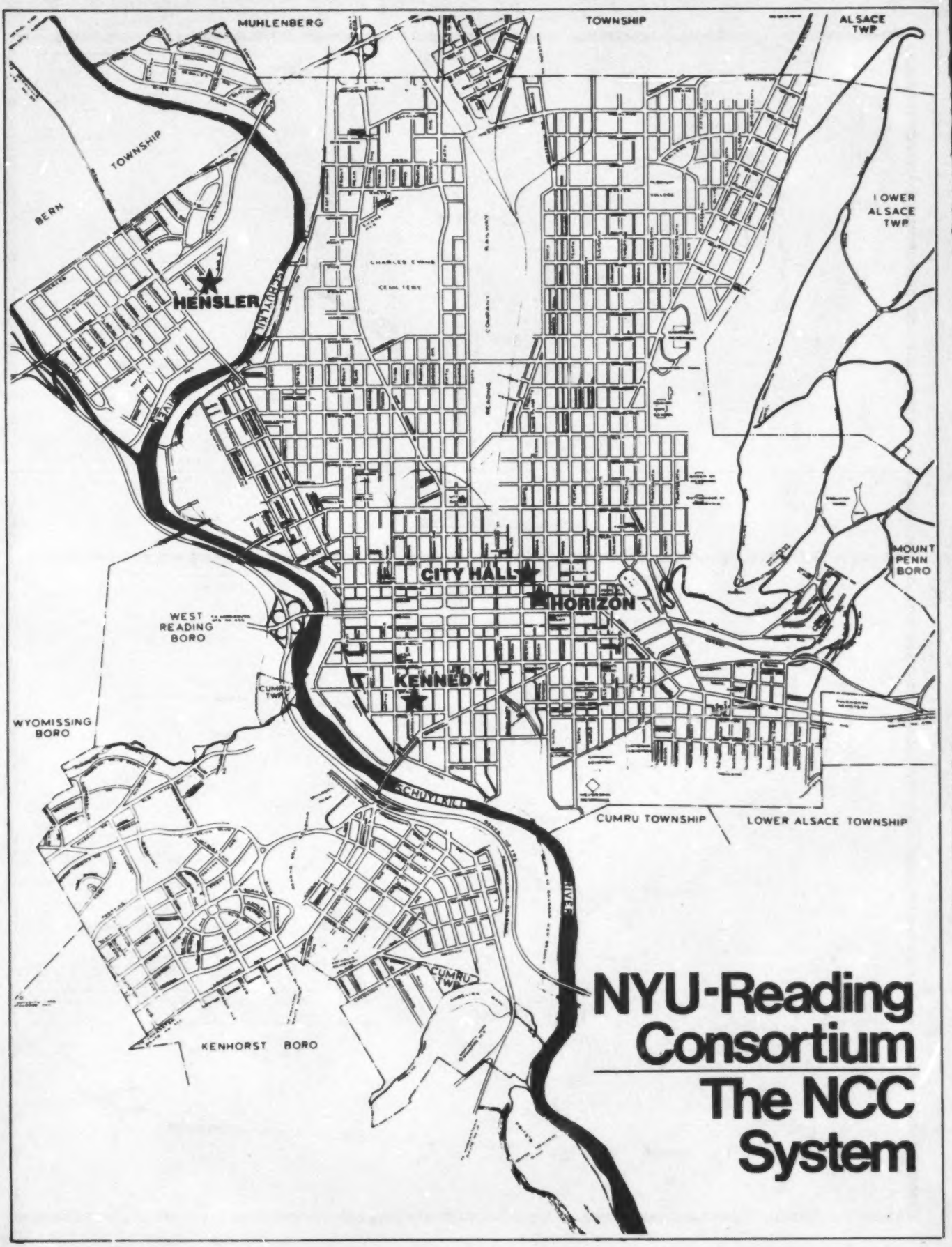
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NYU-Reading Consortium
The NCC System

serve them. Three neighborhood communication centers (NCCs) were linked together via two-way cable to comprise the experimental system.

These centers were located in a multi-service center and two senior citizens' housing projects. The NCCs were equipped with small studio television cameras and large monitors which allowed two-way communication among the three centers. Converters were also installed in the private homes of 117 elderly citizens so that they could view the cable programs over their home television sets and participate by telephone.

The response of the home viewers to the interactive system was so positive that it was decided to carry the programs over a regular cable channel so that all 35,000 local cable subscribers could view the programs and participate by telephone. The offices of the mayor, city council members, and county commissioners were connected to the interactive system on a regular basis. In addition, several local high schools and nursing homes were linked to the system on a rotating basis.

In contrast to technological innovations which emphasize the degree of technical sophistication or the design of equipment, the most innovative element in the two-way cable system in Reading was the direct participation of citizens and public sector organizations in planning and producing their own interactive cable programs. Traditionally, the adoption of technological innovations has been the responsibility of public officials. Consequently, most technological innovations are designed to assist the producer, rather than the consumer, of public services. Rather than asking how public agencies can use cable television to provide public services, we

asked: how can citizens use cable television to obtain public services and to provide services themselves?

During the experimental phase, a staff of local citizens with no professional experience in television production was hired by New York University to operate the interactive cable system. This staff was trained in the use of two-way video equipment and subsequently assumed responsibility for teaching the senior citizens how to use it. Black-and-white video equipment was chosen for the project because it is relatively easy to operate; this made it possible for lay citizens to produce two-way cable television which was technically adequate but not as polished as the one-way television programs carried over commercial television stations.

Although New York University was responsible for the overall management of the project, senior citizens participated in virtually all aspects of the two-way cable system from planning to actual production. Programming consisted of daily interactive sessions which originated from the NCCs as well as from various remote locations such as the city hall and the county courthouse. The programs, which were transmitted two hours a day, five days a week, were initiated and produced by senior citizens and representatives of public organizations in collaboration with the locally-hired staff.

Senior citizens used the two-way cable system to communicate among themselves and with public officials about a broad range of subjects. There were more than four hundred hours of interactive programming over a period of fourteen months. The content included weekly sessions in which senior citizens talked with the mayor, city council members, county commissioners, and representatives of social service agencies. Other programs featured yoga lessons, group singing, discussions of local history and

folklore, cooking lessons, and poetry reading. Rather than having government agencies assume responsibility for the production of programs, senior citizens, acting both as consumers of public services and as the clientele of specific agencies, were responsible for coordinating public service programming.

Through their involvement in the planning and operation of the two-way cable system, senior citizens were able to articulate their preferences for specific types of cable programming directly to local government agencies. More than seventy public and quasi-public organizations used the interactive system to communicate with senior citizens. Twenty of these organizations were regular users of the two-way cable system and fifty participated on an occasional basis.

The involvement of the seniors in the planning and production of the interactive cable programs affected the nature of the services provided as well as the extent of organizational participation. The initial experimental design emphasized evaluation of the impact of the two-way cable system on the utilization of specific social services, such as Medicaid and the Food Stamps Program. However, the subjects in this experiment also had a strong role in defining the content of the experiment, i.e., the programming. In order to insure that senior citizens would assume this role, the interactive cable system could not be oriented solely towards social welfare programs but rather had to encompass a broad array of services which reflected the needs and interests of the elderly as <u>they</u> perceived them. As a result, a considerable amount of social service programming was produced which did not conform explicitly to that which had been proposed for experimental purposes.

In addition to the specific social service organizations which were regular users, numerous local organizations used the system and became familiar with the use of two-way cable television and the needs of the elderly. Public and quasi-public agencies, not primarily concerned with the aged, participated in the programs on an ad hoc basis when senior citizens sought specific information and services from them. The open-ended nature of the Reading cable system and the fact that it depended not upon one agency but upon an aggregation of public agencies encouraged participation by numerous service delivery organizations.

Evaluative Framework

The two-way cable TV system in Reading did not consist of a single technology but rather was a hybrid of several different communications technologies applied to the delivery of public services. Cable television, the telephone, and portable video equipment were combined to produce an interactive telecommunication system for the elderly. By using several technologies already in existence, the capital costs of the project were relatively low and major modifications in the existing cable plant were not required.

The evaluation of the experiment was based upon the fact that the interactive system consisted of these three technologies which were combined to allow senior citizens to participate in a variety of ways. Senior citizens could watch the programming at home and, if they desired, call in; others could attend the NCCs and take advantage of even broader options for participation. Some senior citizens were passive audience members, others

spoke up regularly, and many served as organizers and moderators of the programs. Thus, the two-way system provided a range of opportunities for senior citizen involvement. This meant participation was defined less by the technology than by the interests and skills of the participants.

The complexity of the organizational and technological intervention in Reading required an evaluative framework that brought together different theoretical perspectives and methodological techniques. Although cable technology is essentially straightforward, there is no well-developed body of knowledge about the actual use of two-way cable television. This is especially true with regard to its community uses, where there is uncertainty about dependent variables, the time scales over which they might change, and possible contamination of control groups through community-wide effects. In Reading, the basic methodology for assessing the effects on senior citizens employed experimental and control groups which were surveyed on a before and after basis. Control and experimental groups were designated for each of the neighborhood communication centers as well as for the 117 senior citizens whose homes were equipped with converters. Therefore, "treatment" was defined in terms of access to the two-way cable system.

The survey research analyzed the effects of the interactive system on: (a) persons with access to the neighborhood communication centers, (b) home viewers with access to one-way viewing with telephone call-in, and (c) persons with no access to the system at all. Since the interactive programs were developed by seniors and public officials after the experimental design was formulated, modification of the initial research framework was necessary in order to fully capture the effects of the two-way cable system. New evaluative instruments were devised to measure important, but often unanticipated,

effects of the interactive system: in-depth interviews were conducted with public officials who participated in the two-way system, telephone and mail questionnaires were used in conjunction with the planned survey research, and a content analysis of videotapes of the programming was conducted to analyze the communication processes which occurred over the two-way system. The employment of a variety of evaluative techniques to address different research questions has broadened the overall evaluation of the two-way system to reflect both the planned and unplanned outcomes of the experiment.

Cost of Establishing the System

The cost of establishing the interactive cable system was influenced by the technical configuration of the ATC-Berks TV Cable Co. system, which is a 70-mile, bi-directional, dual trunk delivery system. Five lowband, 40 FM, seven highband, and two midband channels with a downstream bandwidth of 50 - 220 MHz are carried over a new cable trunk line. Upstream transmission occurs through an older trunk cable with a lowband return from 50 - 108 MHz. This bandpass accommodates up to eight television channels originating from various remote sites throughout the cable system which are transported back to the head-end antenna site by a dedicated return trunk. In other words, the existing Reading cable system was not a particularly futuristic system, but it did have unused upstream capability.

The three neighborhood communication centers were assigned separate upstream broadband channels on the "old" cable trunk line, and each center's picture and sound travelled on its assigned channel to the head end. At the head end, a switcher monitored the pictures and sound coming in from each NCC and then switched the appropriate picture onto a downstream cable

channel. The picture might consist of a single NCC or a split-screen showing two NCCs.

The existence of some two-way capability within the cable franchise was a requirement for the experiment which also limited the cost of establishing the system of neighborhood communication centers. The interactive system was established over an eight-month period at a cost of $160,000. The two major expenses were equipment, which cost approximately $63,000, and personnel, at a cost of $56,000. Portable equipment was purchased for three NCCs and for a mobile unit which allowed programming to be cablecast on a rotating basis from various sites in the community. Although there was no charge for the use of the cable lines, the cable company was paid for the cost of installing return lines from the centers, installation of converters, and maintenance of the system.

Programming over the two-way cable system was to achieve two goals: (a) to facilitate spontaneous interaction among participants; and (b) to provide services to senior citizens. At the outset, a substantial amount of personnel resources was allocated to recruitment of senior citizens and service-delivery organizations. Public officials and citizens rarely think of television as more than an entertainment medium, and two-way cable television represented a new technology of which most individuals and groups had no previous experience or knowledge. Therefore, the task of developing relationships with users for the system required community organizing skills in order to develop a social organization in which the citizens, community groups, and public agencies could gain familiarity and skill in using two-way cable television.

The monthly cost of operating the two-way cable system was $13,500 during the first year of the experiment. As the experiment progressed the monthly cost declined; the staff and senior participants acquired greater skill in operating the system, and decreased costs were one benefit of learning. The monthly operating costs were even further reduced when Berks Community Television (BCTV) acquired responsibility for operating the system. Six months after NYU had turned control of the system over to BCTV, the monthly operating costs had stabilized at $8,300 a month, or less than $100,000 per annum. BCTV's monthly costs consisted of $6,500 for personnel and $1,800 for equipment maintenance, telephones, and technical assistance.

The current BCTV staff has five full-time employees and six part-time employees, four of whom are senior citizens. Much of the manpower required for preparing and producing programs is provided by senior citizens who volunteer their services or by seniors who work at low cost. Thus, overall community involvement in the operation of the two-way system is a critical element in keeping the operating costs relatively modest.

Cost of System Operation

The cost of producing the interactive programs was determined by the amount and type of labor required for preparing and presenting the programs. As the experiment progressed, senior citizens, agency personnel, and local staff became more efficient in the use of two-way cable television; thus, during a period of one year, the total number of manhours required to prepare and produce an average thirty-minute program fell from nine hours to just over five hours. The elderly, the agency staff, and the NCC staff contributed approximately one-third each to the total time required to

prepare and present programs. Over the course of the experiment, the elderly became more involved in organizing and presenting programs and the amount of time required from the agency personnel declined.

Including the manpower costs of the NCC staff, the estimated cost of agency personnel time, the estimated value of the labor contributed by senior citizen volunteers, and the overhead costs of operating the system, the average cost per hour of interactive programming during the experiment was $326. This estimate breaks down as follows: overhead $160, NCC staff $103, the value of elderly volunteer time $36, and agency personnel $26 per hour. The costs per hour varied depending upon the content of the program. Costs ranged from $300 per hour of social-recreational programs to $435 per hour of outreach on public assistance.

Interactive programs dealing with publicly-funded social services required extensive agency staff time and thus were more expensive to prepare and present. Programs which the senior aides and elderly volunteers produced were the least costly. During the experiment, the average cost of the cable programs excluding the value of unpaid volunteers was approximately $300 per hour. An average of 52 elderly NCC attendees and 30 home viewers were reached per hour of programming; thus, the average cost per participant hour was $3.65. The extension of the two-way cable programming to all 35,000 cable subscribers contributed an estimated 7.3 viewers per hour of programming for every 100 elderly cable subscribers, or a total of 876 home viewers. This increase in the audience brought the average participant cost per hour down to 32 cents per participant hour.

The Neighborhood Communication Centers

Although the three neighborhood communication centers contained the same equipment, they were established in distinctly different types of

community facilities. Horizon Center, the site of one NCC, was a three-story service center for senior citizens which opened in October 1975, managed by the Berks County Senior Citizens Council. The numerous recreational and educational activities at Horizon Center as well as its proximity to downtown Reading made it a highly accessible facility for the elderly. The NCC was located in a large meeting room within Horizon Center which was used for other activities after the two hours of daily interactive programming.

Kennedy Towers, a high-rise housing project for the elderly, was operated by the Reading Housing Authority and included 150 residents. The NCC at Kennedy Towers was situated in a community lunch room which also served as a site for a Congregate Meals Program. The third NCC was located in Hensler Homes, a garden apartment project for senior citizens also operated by the Reading Housing Authority. Another public housing project, Glenside Homes, is adjacent to Hensler Homes, and a community room shared by both projects was the site of the NCC. The community room was in a separate building which had not been used extensively prior to the establishment of the NCC.

Aside from a core of frequent attenders who participated regularly at each center, attendance patterns generally reflected the distinct differences in geographical settings described above. Horizon attenders came from a wide area extending far beyond the immediate neighborhood. Although 813 people attended the NCC at Horizon Center at least once, only 16% of the elderly residents in the immediate surrounding area are included in this figure. Both the 159 attenders at Kennedy Towers and the 112 attenders at Hensler Homes came from the housing projects as well as from adjacent residential areas. Sixty-three percent of the 150 residents at Kennedy

Towers and 40% of the 102 residents at Hensler Homes attended the NCCs within their respective housing projects. Thus, the two NCCs located in housing projects drew more upon the immediate residential populations than did the NCC located in the multi-service center where participants came from a broad geographical area.

Attenders from the housing projects were equally divided between those who attended frequently (five times or more) and those who attended infrequently (five times or less). Sixty percent of the frequent attenders went to the NCCs once a week or more, and 14% of the frequent attenders presented programs; 21% made suggestions about or plans for future programs. One-third of the frequent attenders spoke up in other ways during the programs. The most important factor determining attendance at the NCCs was the physical capability of the senior citizens: the ability to see, hear, and get around.

Eighty-seven percent of the home viewers watched the programs frequently (once a week or more), and 26% of the home viewers called in during the programs. The survey showed that home viewers were generally younger and in better physical condition than were the NCC attenders. In addition, half of the home viewers lived with their spouses while most attenders at the NCCs lived alone.

Effects of the Two-Way Cable System

The major effects of the two-way cable programming have been found in three general areas:

1. knowledge about public services
2. involvement in political processes
3. participation in social and community activities.

Knowledge About Public Services

Two-way cable programs were conducted to improve senior citizens' knowledge and utilization of social services such as Medicaid and the Food Stamps Program. Information about eligibility requirements, guidance in filling out forms, and changes in the regulations affecting specific federal programs were discussed in sessions with the administrators of service delivery agencies.

As senior citizens became more familiar with both the services and the technology, they developed special formats for providing information about these services. A series of short 'spot' announcements were taped and shown over the system at regular intervals, much like commercials. These spots served as reminders of forthcoming events and tried to provide information and overcome the apparent reluctance of some senior citizens to utilize certain government-supported programs. In both the spots and the interactive programs, senior citizens often gave spontaneous endorsements of social services which encouraged others to use them.

Senior citizens used the two-way cable system to obtain the services they wanted from both the public and private sectors as well as from each other. For example, although a number of seniors requested information on preparing wills, the publicly supported legal services agency was not permitted to provide such counsel. As a result, local attorneys in private practice were sought and donated their time for a program on the preparation and execution of wills. On other occasions, seniors produced videotape programs in which nursing home operators and the directors of a funeral home described the cost and nature of the services they provided which, although private, are still of vital importance to the elderly.

On several occasions, senior citizens used the interactive cable system for peer group counseling programming on such personal issues as sex, insomnia, and when to stop driving a car. In addition, informal counseling of this sort occurred at all times and through all programming of whatever type; this ever-present potential for peer interaction and advice was one of the distinctive features of the two-way system. Often, the bundle of services provided by public agencies meets only a small portion of the needs of citizens. The role of senior citizens in determining the nature of the interactive cable programming thus led to the provision of services through cable television which otherwise were not readily accessible to the elderly in Reading.

Several factors made it difficult to fully test whether the two-way cable system had increased the use of specific public services by senior citizens, and hence there were no conclusive results on this score. In order to respond to the diverse interests of senior citizens, it was necessary to effect a trade-off between the requirements of experimental research and the preferences articulated by the users of the system. The senior citizens responsible for coordinating programs were primarily volunteers; it is unlikely that they would donate their services if most of the programs were externally imposed to meet research requirements. Further, the one-year interval between the "before" and "after" surveys permitted senior citizens to have exposure to only nine months of the two-way cable programs, and significant changes in their behavior were not likely to occur within such a short time period.

The impact of service delivery programming is primarily reflected in the increased knowledge and awareness which senior citizens have regarding specific social services. Such information allows them to be more informed

and effective consumers but it does not necessarily produce immediate demand for services. For example, there was extensive programming to encourage senior citizens to participate in the federally-funded Food Stamps Program, a program which the elderly appear not to have taken full advantage of. Although there were no significant changes in the utilization of food stamps, there were increases in the percentage of elderly who had considered using food stamps.

Such findings suggest that the use of service information obtained through the cable programming may have cumulative effects which require a long period of time to emerge and even then may occur only when particular needs arise. In addition, information about social services may simply represent broadened options for the senior citizens which enhance the individual's perception of the alternative "coping" mechanisms available to him and so act as a safety valve, even if unused.

Senior citizens' awareness and use of some local services also appeared to be associated with participation in the two-way cable system. NCC attendees showed larger increases than non-attendees in the use of the Congregate Meals Program. Though this is partially due to the fact that one NCC was also the site for a congregate meals center, the interactive programming, in bringing people together, may well have encouraged use of the group meals program. Home viewers with converters also showed greater increases in knowledge of and familiarity with several local services provided by voluntary organizations, than did the corresponding control groups.

Involvement in Political Processes

One area in which programming has proved to be particularly effective is that of citizen-government interaction. The City of Reading is governed

by a modified commission form of government in which legislative and administrative duties are combined. There are four city councilpersons and a mayor, each of whom has authority over one or more municipal departments. The mayor is elected for a four-year term and two councilpersons are elected to four-year terms in odd numbered years. Although the entire council must approve most personnel and budgetary matters, the individual councilpersons have considerable control over the operations of their departments.

At the outset of the project, the mayor agreed to participate in a monthly program, titled "Meet the Mayor," in which he would discuss municipal affairs with senior citizens. The success of this program led to the development of a weekly program in which each member of the city council appeared once a month to meet and talk with senior citizens. These informal programs allowed senior citizens to articulate their interests directly to elected officials on a regular basis without encountering the time or travel costs of visiting city hall or the institutional and psychological constraints of participating in formal public meetings. The content of the teleconferences was open-ended; it was a product of senior citizens' concerns and the expertise of the participating officials. Citizens used the programs to request information, make specific demands, and evaluate municipal policy.

The issues discussed over the two-way cable system ranged from specific neighborhood concerns for street repairs and stop signs to more generic policy matters such as housing and property taxes. The two most discussed topics were "local government and politics" and "municipal budget and finance." Because each Reading councilperson has administrative responsibility for a set of municipal departments, the subject of each teleconference was often focused on the specific service functions under his or her control. This encouraged the participants to have an in-depth discussion of particular local problems rather than to have a superficial dialogue on municipal

affairs. Moreover, the commission form of government allowed the citizens to press for and receive specific commitments from their elected representatives who were also in the position of having direct administrative authority over the municipal bureaucracy.

Both citizens and public officials developed skills in communicating electronically over the course of the experiment. Participants became more skilled at expressing their opinions and giving information as well as more assertive in stating their positions. Senior citizens, in particular, became more assertive in their comments and showed significant increases in the number of times they stated their position, advocated specific action, and proposed policies for the elderly. The two-way cable system also personalized the contact between citizens and politicians. In the Reading cable system, it was not unusual for citizens to address the mayor by first name and for the mayor to respond in kind.

For elected officials, the electronic meetings helped to accomplish one of their essential functions. Communication with constituents is a basic element of the job; the process of speaking through two-way cable television to citizens provided a convenient and reliable means of "staying in touch" with voters and demonstrating responsiveness to the constituency. In addition, information could be conveyed directly from citizens to public officials without the filtering process that normally occurs in bureaucracies.

Findings from the survey of senior citizens indicate that the two-way cable system increased senior citizens' awareness of local issues and their sense of political efficacy. Citizens in the experimental groups were more able to identify local problems than those in the control groups. Respondents with access to an NCC and home viewers with converters were more

familiar with local agency personnel than their control group counterparts. The belief that "older persons in Reading usually stand up for their rights" rather than "give in too easily" increased in all experimental groups while none of the control groups showed an increase.

The two-way cable system has also provided the basis for mobilizing senior citizens as a political group. Two of the four experimental groups showed increases in the percentage who felt collective action is the best way for older persons to get the city and the government to pay attention to the needs of the elderly. When asked whether senior citizens needed their own organization "to look out for their needs and rights" three of the four experimental groups showed larger increases in the percentage who felt such organizations were needed to gain power than those in the comparable control groups.

Participation in Social and Community Activities

It is also important to note that the two-way cable system served important purposes other than the provision of public services. The neighborhood communication centers brought people together, albeit to participate in cable programs; nevertheless, they formed a community context in which the elderly could meet and talk with each other before and after programming. Eighty-four percent of the frequent attendees at the neighborhood communication centers said that the two-way cable programs had resulted in making or renewing friendships for them. More than 20% of the participants felt that the two-way cable programs helped them participate in discussions elsewhere.

Close to half of the home viewers with converters reported that they jointly viewed the cable programs with other people in their homes. One

woman reported that eight or nine persons regularly came to her home to participate in the programs. Such group-viewing in private homes was necessary when only 117 homes were equipped with converters which were linked to the system.

Each of the experimental groups also had larger increases in their involvement in group activities than their control groups, but the specific form of this heightened social involvement varied according to the experimental site. At Kennedy Towers, participation in senior citizen clubs and similar organized activities increased among those involved in the two-way cable programs; at Hensler Homes, NCC participants showed an increase in informal social activities. Home viewers with converters living near Horizon Center had higher rates of participation in education programs and in Horizon Center activities than did their comparable control group. The impact of the NCC system on senior citizen involvement in the community thus varied depending upon the accessibility of particular activities to the experimental group.

Most important, the interactive cable system provided an opportunity for the elderly to engage in activities which drew upon the skills and training they had acquired over a lifetime and to develop new skills as well. Most of the social service cable programs were coordinated by a retired social service worker. A seventy-seven year old woman, once active in politics, moderated the weekly citizen-government teleconferences. By having senior citizens in productive and significant roles, the two-way cable system provides a dramatic contrast with the stereotyped and dependent images of the elderly that characterize broadcast television programs.

When asked whether the interactive cable system made them feel better about themselves or other senior citizens, 84% of the frequent attenders

and 91% of the frequent home viewers said yes. The participants felt that the programming had reduced isolation and served as a source of human contact. The status and visibility generally associated with television has also affected senior citizen participants. As a result of their role in the two-way cable programs, certain seniors are regularly recognized and greeted in the community by fellow citizens who first saw them on the cable system. Clearly, the two-way cable programs have enhanced the self-esteem of the elderly participants and strengthened their social ties with each other and the community.

An overall assessment of the senior citizens' response to the two-way cable system is reflected in their response to a question concerning whether anything had been done to improve their lives during the past year. Experimental groups were more likely to respond positively than control groups and of those who felt there were improvements, approximately 25% of the attendees and 80% of the home viewers identified the interactive cable television system as the major improvement in their lives.

Involvement of Service Delivery Organizations

The findings from the Reading cable project indicate that public and quasi-public agencies utilize the two-way cable system for a variety of reasons. Certain agencies regard the interactive cable system as an innovative means of providing outreach services which are otherwise conducted through staff visits to individuals and community centers within the urban area. The municipal and county governments view the cable as a mechanism for obtaining citizen feedback on public policies and programs, while other service agencies utilize the two-way programming to disseminate information to clientele who are harder to reach. Finally, for some organizations, the

system serves as a tool for gaining exposure and enhancing their status in the community.

Findings from a survey of public officials participating in the cable programming indicate the importance of institutional structure in the use of interactive telecommunications. Differences were found in the goals that the programming served for elected officials versus appointed officials. Almost two-thirds of the elected officials reported that the major effect of the system was "receiving input" and "allowing interaction" while only one-fifth of the appointed officials considered "receiving input" or "interaction" to be products of the system. Elected and appointed officials also differed in the extent to which their organization's goals were achieved by the two-way cable system. More than 75% of the elected officials stated that their goals for the programming were reached while only 43% of the appointed officials clearly felt their agency's goals were achieved. The difference in the perceived value of the two-way cable system between the elected and appointed officials suggests that direct accountability to the electorate, as well as power to effect change, play important roles in the impact of two-way cable programming. Thus, if interactive cable television is to be used in the provision of social services, it is clear that attention must be given to the character of the relationship between the participating citizens and the public officials, as well as to the nature of the service function itself.

The Reading project also demonstrates that there is no homogeneous set of public services that can be simply or easily transferred to cable television. For some organizations, the two-way system allowed traditional activities to be conducted in a new context. For example, citizen-government interaction and adult education courses were particularly compatible

with the structure and format of the Reading system. Politicians could gain recognition among voters and educators could attract a new source of students. For other organizations, the interactive cable system was less easily integrated into an agency's on-going functions. Information and referral services were provided over the two-way cable system but services which required detailed confidential information could not feasibly be provided through such a "public" medium.

For several organizations, the two-way cable system offered a means to reach a large number of senior citizens without the costs of making in-person visits to individuals and groups or the costs of transporting senior citizens to a central meeting site. Moreover, by relying on senior citizens to coordinate cable programs, public organizations were able to use the cable system on an incremental basis without investing substantial amounts of staff time and resources in planning and development.

Continuation of the Experimental System

The effectiveness of the Reading two-way cable system is most markedly reflected in the support which the community has given to Berks Community Television (BCTV), a local non-profit corporation which was created to operate the system at the termination of the experimental phase. The corporation is governed by a board of directors consisting of representatives from the city and county governments, senior citizens organizations, educational institutions, private firms, and the local cable television company. It has continued the institutional framework for public service uses of cable television in which senior citizens are largely responsible for producing the interactive programs.

The transition from an experimental system to a community-operated two-way cable system was the result of a two-year planning process which was initiated at the beginning of the project. During the planning phase, New York University provided the technical assistance and administrative support for the establishment of Berks Community Television, but since March 1977, the interactive cable system has been managed by the local community. During its first year of operation, Berks Community Television has had remarkable success in converting a federally-subsidized experiment into a community-supported venture. Funds to support the continuation of the system have been raised through individual donations, cake sales, and contributions from local industry. The municipal government has allocated $10,000 for Berks Community Television and the county government has also provided financial support for the interactive system. Grants from the National Endowment for the Arts and the Pennsylvania Committee for the Humanities have been awarded to BCTV for specific program series.

Since the experimental phase ended in March 1977, substantial changes have occurred in the scope of the two-way programming. BCTV now conducts interactive programming during the evening in addition to its daytime hours. The mayor and city council, in order to reach a wider audience, have moved their teleconferences from daytime to the early evening. Evening programs have also been used to allow citizens to participate in city budget hearings and for hearings on the allocation of federal community development funds. Citizens in Hamburg and Kutztown, each located approximately 25 miles from Reading, regularly participate in the interactive programs through a microwave interconnect with the Reading system. A local branch of Penn State University uses the interactive system to conduct adult education courses on the system.

A larger number of origination sites for programming have also been developed by BCTV. By rotating the mobile unit among several locations, such as a branch library and city recreation center, the two-way cable system has been able to reach new groups in the community. These new origination sites in combination with the expanded scope and hours of programming have allowed BCTV to serve the non-elderly as well as the elderly in Reading. A telephone survey of the 35,000 households subscribing to the ATC-Berks TV Cable Co. indicated that 14,140 representatives of households had watched BCTV at least once. Twenty percent of those respondents watched BCTV regularly once a week or more.*

New organizations have sought to participate in the two-way cable system. The sponsor of a new senior citizen apartment building has allocated funds to establish a neighborhood communication center for residents to participate in the interactive cable system. A state mental hospital located 16 miles from Reading has applied for and been awarded a federal grant to purchase equipment to link the hospital with BCTV to reduce the isolation of patients.

Conclusion

The total cost of setting up the Reading two-way cable system, $160,000, and the present cost of cable programming, $8,000 per month, proves that

* Two factors make this a highly conservative estimate of regular viewers. Several senior citizen housing projects, including Kennedy Towers and Hensler Homes, were not included in the sample; and more than one household member often watches a television set at one time. The demographic characteristics of those who had ever watched BCTV were substantially different than the target audience sought by most commercial television programs. BCTV viewers were generally older, more likely to be widowed or retired, and had lower incomes than non-viewers. Seventy percent of those who watch BCTV regularly more than once a week are 55 years or older. In terms of viewership and programming, BCTV has clearly been able to provide an alternative to traditional broadcast television fare.

community uses of cable television can be developed and maintained at relatively low cost. Although the free or low-cost labor provided by the elderly may not always be available, the Reading project clearly demonstrates that ordinary citizens can produce interactive cable programming. Moreover, the low cost of providing social service information over the system compares favorably with traditional service delivery mechanisms. Although the interactive cable programs did not produce increases in the use of social services, the two-way cable programs did improve senior citizens' knowledge of public services and their skills as consumers of public services. Further, it strengthened senior citizens' contact with each other and their involvement in community affairs.

The interactive cable system provided an organizational and technological environment in which learning could occur. Senior citizens, the local staff, and public officials developed expertise in the use of cable technology which led to increased efficiency in the operation of the cable system. Citizens and elected officials also gained skills in communicating over the course of the project. Participants became more adept at expressing their opinions and giving information as well as more assertive in stating their positions. Perhaps the ultimate test of the experiment is reflected in the willingness of the local users to commit their time, efforts, and financial resources to the continuing operation of the interactive system.

Although the Reading cable system was designed to provide a specific set of public services, it has more accurately functioned as a community communications system. What has clearly emerged is the development of a communications infrastructure that serves a diversity of needs. For a city like Reading, without its own broadcast television station, the interactive

cable system is a vital means of communication between senior citizens and government agencies. In an era when telecommunications have most frequently been used to overcome territorial boundaries and thereby transcend local values, the two-way cable system in Reading demonstrates the potential for communication technology to reinforce community consciousness and to reflect the distinct preferences and priorities of an age-based sub-group of the population. The Reading cable system has fostered a sense of community at the local level by increasing the community's dependence on its own resources, rather than imported ones.

Although the exact nature of the Reading cable system may not be generalizable to communities elsewhere, the principles underlying the experiment are clearly applicable to other settings. The principles entail:

1. The role of citizens as initiators of programming.
2. The use of local neighborhood facilities as the origination sites for programming.
3. The reliance on spontaneous, interactive programs.
4. The aggregation of organizations to generate a diversity of public service programming.
5. The emphasis on programming to serve distinct sub-groups of the population.

By having citizens initiate the programming, the consumers of services rather than the producers of services have the incentives for developing public service applications. Service delivery organizations are not in the position of trying to find a use for cable technology but rather can respond to the requests of consumers for specific public service programming. By aggregating organizations to use interactive cable television, many public agencies can participate in cable programming without a major investment of resources.

The use of neighborhood-based centers builds upon existing community organization and provides a familiar and non-institutional setting for participants. Spontaneous programming enhances the flexibility of interaction and responsiveness to citizen preferences. Programs oriented towards population sub-groups allow cable television to serve specialized communities which may be defined by age, race, cultural values, or other characteristics. Such programming permits cable television to serve important social and political functions which are not available through conventional broadcast television. The particular process by which these principles are applied will, of course, vary from city to city.

The Reading project clearly demonstrates that sufficient resources exist at the local level for public service uses of cable television to be developed and sustained. For other communities to benefit from the findings of the Reading project, it is necessary that public policy for cable television continue to require that cable systems have two-way capability and cable channels be designated for public uses. Further, citizens and policy-makers must assure that both the technical configuration and organizational arrangements for urban cable systems be designed to strengthen local community communications. This requires not only that a cable system have two-way capability, but that neighborhood facilities and portable equipment be available for citizens and community groups to develop their own interactive programs. Finally, it will be necessary to create an institutional framework through which citizens and service delivery organizations can jointly develop two-way cable programs.

The experience in Reading shows that cable television can effectively serve the information needs and preferences of urban citizens. In an era

when information plays an increasingly important role in public policy-making, cable technology makes it possible for individuals and groups at the local level to have their own means of electronic communication. By strengthening citizen access to and control over information, cable television enhances the ability of citizens to communicate with public officials and to participate in community processes. The findings from the Reading cable experiment highlight the need for federal, state, and local units of government to formulate and carry out policies which provide an opportunity for the potential of interactive cable television to be fully realized.